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Substrate And Process Engineering For Biocatalytic Synthesis And Facile Purification Of Human Milk Oligosaccharides (HMOs)

Tech ID: 33436 / UC Case 2022-559-0

ABSTRACT

Researchers at the University of California, Davis have developed an innovative method for efficient, high-yield production and easy purification of Human Milk Oligosaccharides (HMOs) using a Multistep One-Pot Multienzyme (MSOPME) process.

FULL DESCRIPTION

Researchers at the University of California Davis have developed a process that couples substrate and process engineering for the synthesis and purification of structurally defined HMOs. It employs a glycosyltransferase acceptor substrate-tagging strategy, where the carboxybenzyl (CBz) tag simplifies the purification process via the C-18 column and can be easily removed post-purification. This MSOPME process enables production of complex targets without intermediate oligosaccharides' isolation, with a single C18-cartridge purification process of the final product.

APPLICATIONS

- ▶ Production of key ingredients in products aimed at improving human health.
- ▶ Creation of prebiotics and bacteriostatic agents.
- ▶ Development of nutrients for brain development.
- ▶ Production of potential nutraceuticals and therapeutics.
- ▶ Supplement for infant formulas.

FEATURES/BENEFITS

- ▶ Efficient synthesis of complex HMOs without the need for intermediate oligosaccharides purification.
- ▶ Facilitated HMO product purification using a single C18 cartridge/column through the use of a CBz tag.
- ▶ Easy removal of CBz tag to form desired HMOs with a free reducing end.
- ▶ Ability to synthesize structurally defined HMOs in preparative and gram scales.
- ▶ Environmentally friendly enzymatic production method.
- ▶ Potential to be readily adapted for automation.
- ▶ Solves limited access to structurally defined HMOs in sufficient quantities.
- ▶ Addresses need for intermediate steps in the synthesis and purification of HMOs.
- ▶ Overcomes challenges associated with large-scale production of HMOs.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Reference for National Filings	WO 2023/141513	07/27/2023	2022-559

Patent Pending

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OTHER INFORMATION

KEYWORDS

biocatalysis, carbohydrate, chemoenzymatic synthesis, glycosylation, human milk oligosaccharides (HMOs)

CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ Health
- ▶ Other

RELATED CASES

2022-559-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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- ▶ One-Pot Multienzyme Synthesis of Sialidase Reagents, Probes and Inhibitors
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